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GUNTERICHTHYS LONGIPENIS, A NEW GENUS AND SPECIES OF OPHIDIOID FISH FROM THE NORTHERN GULF OF MEXICO

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Since 1963 I have received five collections of a small undescribed ophidioid fish, referable to the tribe Dermatopsini (Cohen, 1966), from Mississippi Sound and adjacent waters. The collections were provided by Mr. J. Y. Christmas, members of the Gulf Coast Research Laboratory larval shrimp project, Mr. Bruce Hensen, and Mrs. Josephine G. Curtis.

Dr. David Caldwell, Los Angeles County Museum, and Messrs. Robert Ingle and Martin Moe, Florida State Board of Conservation, kindly loaned comparative material from collections in their care. My appreciation is expressed to Dr. E. A. Lachner and his staff for many courtesies extended during my visits to the Division of Fishes of the United States National Museum and to Dr. William Gosline for his comments on the manuscript. Special acknowledgment is due Dr. Daniel M. Cohen for permitting examination of type-material in his care, for allowing me to consult his (then unpublished) MS on the tribe Dermatopsini and for his interest and assistance in this study.

The type-material has been deposited in the collections of the United States National Museum (USNM) and the Gulf Coast Research Laboratory (GCRL).

GUNTERICHTHYS, new genus

Type-species: Gunterichthys longipenis new species.

Diagnosis: An ophidioid fish with dorsal and anal fins separate from caudal; ventral fins of one ray each, inserted posterior to cleithral symphysis and approximately below middle of opercle. Eyes small, distinct and covered with skin; posterior naris subequal to or larger than eye, and with slightly elevated margin; chin barbel absent. Preopercular margin

not free, but delineated by dermal fold; preopercle with single slitlike pore at angle; opercle with single, slender, weak spine. Head scaleless but microscopically papillose; body scales barely overlapping; vertical fins, pelvic and pectoral fin bases scaleless. Gill openings broad, lateral; gill membranes free from isthmus. Developed gill rakers both above and below first gill arch angle. Maxillary not vertically expanded behind and not completely concealed by a dermal fold of the cheek. Vomer with enlarged depressible teeth; palatine teeth enlarged; maxillary teeth mainly villiform; lateral mandibular teeth, in part, enlarged, depressible and caniniform. Lacking pyloric caecae and pseudobranchiae; lateral line inconspicuous. Body compressed, gradually tapering posteriorly, dorsal and ventral margins slightly convex. Caudal fin long, narrow and pointed; with 13–14 rays. Male with long, pointed, distally hardened intromittent organ, and one pair of broad, hardened claspers. Dermal envelope of anal fin, in both sexes, very loose near anal origin, continuing forward as a fold on either side of genital apertures to form a protected scoop-like enclosure. Presumably viviparous.

Relationships: The scaleless head, the barely overlapping body scales, the presence of a single pair of hard genital claspers and the absence of vertical expansion of the posterior maxillary places *Gunterichthys* in the tribe Dermatopsini (Cohen, *op. cit.*). It differs from other included genera (*Dermatopsis* Ogilby, *Dermatopsoides* J. L. B. Smith and, tentatively, *Diancistrus* Ogilby) in having all gill membranes free from the isthmus, body scales slightly overlapping rather than non-imbricate or absent, a microscopically papillose head, fewer caudal rays, and in the specialized development of the genital enclosure.

I take pleasure in naming this genus after Dr. Gordon Gunter.

Remarks: Two genera of small viviparous ophidioid fishes with separate caudal fin and hard copulatory apparatus (*Ogilbia* Jordan and Evermann and *Dinematichthys* Bleeker) have been reported from shallow waters of the western north Atlantic Ocean. Although the status and systematics of these two genera are presently confused, both have at least partially scaled heads and are thereby separable from *Gunterichthys*.

Gunterichthys longipenis, new species
(Fig. 1)

Holotype: USNM 199431; 45 mm in standard length (SL); male: on north shore of Davis Bayou, off Mississippi Sound, Mississippi (USCGS Chart 1267); 27 March 1965.

Paratypes: USNM 199757; 36 and 34 mm SL; male and female respectively; Mississippi Sound, on north shore of Horn Island, Mississippi, at Horseshoe; 4 December 1963. GCRL V64:1046; 39 mm SL; male: data as for USNM 199757. USNM 199430; 44 mm SL; male; apparently infected with lymphocystis disease; Mississippi Sound near east end of Ship Island, Mississippi; larval shrimp trawl, maximum depth 2 m; 6 March 1963. GCRL V66:1527; 38 mm SL; male; on

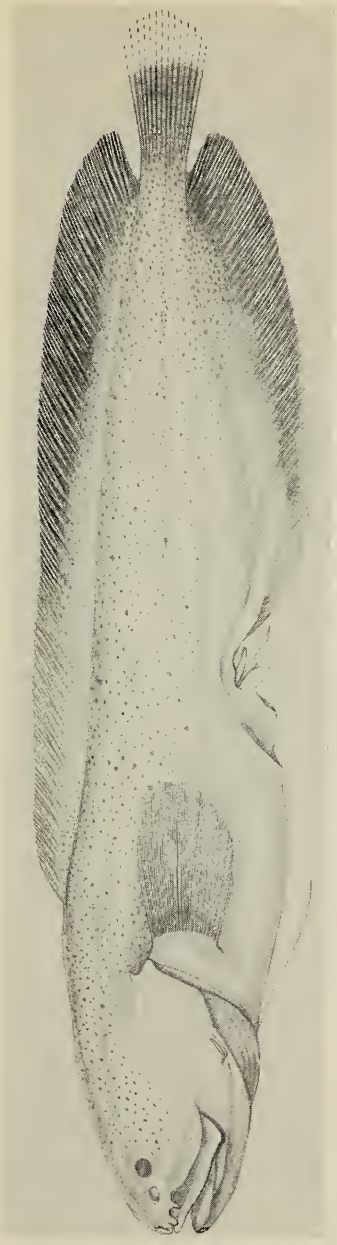


FIG. 1, *Gunterichthys longipenis*. USNM 199431; holotype; 45 mm SL. Lateral line organs, scales and head papillae not shown. Drawn by Mildred H. Carrington.

shore of Biloxi Back Bay, Mississippi; 10 February 1966. GCRL V64:1048; head and anterior body only; male; entrance to Davis Bayou, Mississippi; 3 January 1964. The latter specimen has been cleared and stained with alizarin.

Description: Body compressed, greatest depth just before dorsal origin; head depth and width subequal, slightly less than 1.5 in head length; body width almost twice in head width. Dorsal head profile curving gradually downward to the blunt and narrowly rounded snout; ventral profile rises even more gradually to the slightly included lower jaw. Skin covering head and fins and skin about genital apertures very loose. Snout length slightly less than interorbital width; interorbital broad, slightly convex, with suggestion of a median longitudinal ridge which appears to originate at snout and continue posteriorly to nape. Anterior naris large, tubiform, short, located near anterior margin of upper lip, slightly overhanging premaxillary; posterior naris close to eye, margins slightly elevated, diameter subequal to or greater than eye. Eye minute, averaging 18.5 in head, without free margins, covered with translucent skin devoid of melanophores over eye. All but posterior third of maxillary concealed by dermal fold of the cheek; posterior maxillary margin arcuate, lower angle scarcely produced, not spinelike.

Opercle with one slender, weak, pointed spine located some distance from opercular margin at the level of upper opercular angle; penetrating skin in two specimens. Preopercular margin indistinct, delineated only by low dermal fold.

Snout and fleshy suborbital developed as pronounced fold overhanging thin skirtlike upper lip which is somewhat produced medially. Slitlike pore, subequal in diameter to anterior naris, present on inferoanterior margin of snout between median symphysis and anterior naris; a second slit, with length approaching twice anterior naris diameter, extends along inferolateral snout margin from near posterior border of anterior naris to hind margin of posterior naris. This slit vertically bisected by a septum which is incomplete at base. Minute pore present slightly removed from suborbital margin above ventral angle of maxillary; another pore, about twice first pore diameter, similarly located near posterior angle of suborbital fold. Preopercular fold with single slitlike pore, subequal in diameter to eye, on inferior margin of lower angle. Slightly above middle of this pore, in line with rear end of maxillary, is a single, short, stout, sensory papilla. Similar papillae located dorsally on head; one behind each eye, six across interorbital, two on either side of midline of snout, and two, widely spaced, near upper margin of each naris; all are inconspicuous and difficult to see. Minute tubule and pore present on dorsolateral margin of head at about one-third of distance between interorbital and nape, closest to eye. A well-developed circular dermal fold present below lip on both sides of lower jaw symphysis; within each is a slitlike pore and a stout sensory papilla atop a short fleshy pedestal. Behind and inferior to these is an additional pair of large pores opening supralaterally within a subcircular fleshy

TABLE 1. Measurements (mm) and counts of *Gunterichthys longipenis*. Figures in parentheses are percentages of standard length or head length.

	USNM 199431 Holotype	USNM 199757 Male	USNM 199757 Female	USNM 199430	GCRL V64:1046	GCRL V66:1527	$\bar{X}\%$
Standard length	45.0	35.5	34.4	43.9	39.2	37.5	
Caudal fin length	—	6.8 (19.2)	6.2 (18.0)	7.2 (16.4)	7.3 (18.6)	—	18.0
Least caudal peduncle depth	1.9 (4.2)	1.6 (4.5)	1.5 (4.4)	1.9 (4.3)	1.6 (4.1)	1.5 (4.0)	4.2
Body depth at anal fin origin	7.5 (16.7)	6.1 (17.2)	6.1 (17.7)	7.9 (18.0)	6.2 (15.8)	5.8 (15.5)	16.8
Predorsal length	15.1 (33.6)	12.4 (34.9)	12.9 (37.5)	14.9 (33.9)	13.4 (34.2)	12.7 (33.9)	34.7
Preanal length	25.1 (55.8)	19.7 (55.5)	18.6 (54.1)	24.1 (54.9)	21.2 (54.1)	21.2 (56.5)	55.2
Pectoral fin length	7.5 (16.7)	5.9 (16.6)	5.8 (16.9)	7.4 (16.9)	6.3 (16.1)	6.1 (16.3)	16.6
Ventral fin length	7.8 (17.3)	6.4 (18.0)	6.2 (18.0)	8.1 (18.4)	7.9 (20.2)	5.5 (14.7)	17.8
Distance from ventral insertion to anal fin origin	16.2 (36.0)	11.5 (32.4)	10.8 (31.4)	15.2 (34.6)	12.9 (32.9)	13.5 (36.0)	33.9
Snout tip to ventral fin insertion	9.4 (20.9)	8.2 (23.1)	8.1 (23.6)	9.8 (22.3)	7.9 (20.2)	8.2 (21.9)	22.0
Longest dorsal ray length	4.4 (9.8)	3.6 (10.1)	4.1 (11.9)	4.7 (10.7)	—	4.4 (11.7)	10.8
Longest anal ray length	4.4 (9.8)	3.5 (9.9)	4.1 (11.9)	4.7 (10.7)	—	4.0 (10.7)	10.6
Head length	11.5 (25.6)	10.1 (28.4)	10.0 (29.1)	11.7 (26.5)	11.1 (28.3)	10.3 (27.4)	27.6
Eye diameter	0.7 (6.0)[1]	0.5 (5.0)	0.5 (5.0)	0.7 (6.0)	0.5 (4.5)	0.6 (5.8)	5.4
Snout length	2.3 (20.0)	2.0 (19.8)	2.0 (20.0)	2.2 (18.8)	2.1 (18.9)	2.0 (19.4)	19.5
Postorbital length	8.5 (73.9)	7.6 (75.2)	7.5 (75.0)	8.8 (75.2)	8.5 (76.6)	7.7 (74.8)	75.1
Snout tip to rear of maxillary	5.5 (47.8)	4.0 (39.6)	3.8 (38.0)	5.4 (46.2)	4.5 (40.5)	3.9 (37.9)	41.7
Fleshy interorbital width	2.7 (23.5)	2.0 (19.8)	2.2 (22.0)	— —	2.1 (18.9)	2.3 (22.3)	21.3
Number of dorsal rays	66	68	64	66	66	64	
Number of anal rays	45	50	46	45	47	45	
Number of caudal rays	13	14	14	14	14	13	
Number of right pectoral rays	19	19	18	22	18	19	
Number of left pectoral rays	20	19	18	21	—	19	

[1] This and following proportions shown in percent of head length.

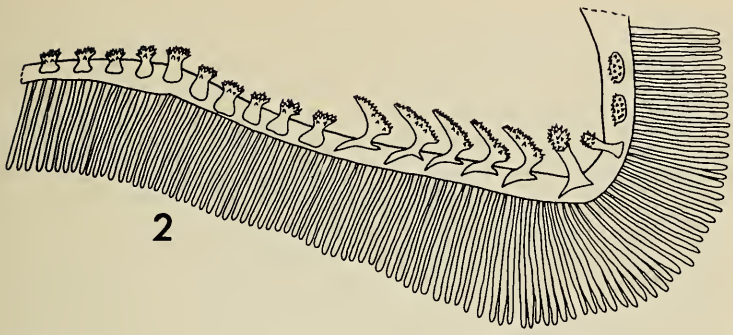
fold about the midline. Slitlike pore present on upper anterior mandibular margin just beneath lower lip; three subcircular pores with slightly elevated margins equally spaced along inner third of submandibular surface, the last near lower mandibular angle. Anterior submandibular surface with about six stout sensory papillae, with three or four others distributed posteriorly.

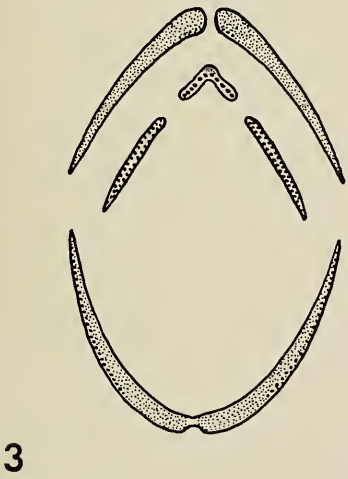
Cleithrum extends forward ventrally to a point about midway between lower preopercular angle and rear end of maxillary; in cleared material cleithrum extends almost to the level of maxillary. Gill arches four, with slit behind fourth. First arch gill rakers (Fig. 2), described from cleared paratype material, as follows: two oval dentigerous patches and one long clubshaped raker on epibranchial, then a longer, stouter, similarly shaped raker at angle followed, on ceratobranchial, by five rather long, broad, sickleshaped rakers and five smaller knoblike rakers. Hypobranchial bears five similar knoblike rakers; all rakers crowned by dentiform processes.

Premaxillary teeth (Fig. 3) predominately villiform and in several irregular series; inner teeth near symphysis increase some in size; these teeth depressible and slightly recurved. Vomer broadly V-shaped, bearing about eleven sharply pointed, depressible, conical teeth which increase in size outward from apex; several villiform teeth present at anterior apical margin. Palatines with smaller teeth, similar to those of vomer, in what appears to be two longitudinal series; some minute villiform teeth also present. Dentaries narrowly united but edentate at symphysis, anteriorly covered with villiform teeth but with inner row of rather larger, sharp and depressible, conical teeth. Laterally, there is a narrow outer series of villiform teeth and an inner series of about 25 or 30 large, depressible, caniniform teeth, somewhat recurved near tips. Three suprabranchial patches of villiform teeth located between 1st and 4th arches present on each side; these teeth closely approximated, middle patch the largest.

Dorsal fin originating over middle or anterior third of adpressed pectoral fin; low at origin with longest rays posteriorly; all rays branched except anteriormost which may (in four specimens) be simple. Anal fin origin somewhat closer to rear margin of hypural than to snout tip; rays branched, longest posteriorly. Dorsal and anal fins separate, not confluent with the long, narrow and pointed caudal fin. Pectoral fin inserted at slight angle, originating on moderate peduncle; narrowly rounded with all rays branched, none separate. Ventral fins, each a single ray with two hemitrichs, approximated at base and inserted below middle of opercle; somewhat longer than pectoral fins.

Scales small, cycloid; freqently separate, subcircular and embedded near anteroventral abdominal margin, otherwise barely overlapping and somewhat oval. Head, chest anterior to ventral insertion, pectoral axil and peduncle and all fins scaleless. Head with minute ciliated papillae; cilia colorless, the longest about 0.1 mm; most abundant dorsally, rather sparse on preopercle and apparently absent from snout tip and upper





FIGS. 2–3, *Gunterichthys longipenis*. 2, First gill arch. 3, Dentition. Author's semi-diagrammatic delineations from GCRL V64:1048, paratype.

lip. No thick mucous coating on head or body. Lateral line inconspicuous; evidently in two parts; delineated by rather widely spaced minute papillae. Midlateral series of papillae originating beneath upper third of pectoral fin and extending to near hypural; about 25 papillae over this distance. Second series of papillae originating near upper opercular angle and, passing about midway between median sensory line and dorsal fin insertion, extends at least as far posteriorly as 40th–41st dorsal fin ray.

In both sexes the anterior plane of the anal fin is broadly flattened basally and the dermal sheath continues forward on either side of the genital aperture (Fig. 1) as a loose fold to form a protective scooplike enclosure. In males, these folds join the posterior portion of a swollen muscular prominence containing the anus; in females, they join to form a loose fold surrounding the anus and the genital opening behind. Externally, the male copulatory apparatus consists of a single pair of broad, slightly retrorse claspers, a long, distally hardened, posteroventrally directed intromittent organ and a broadly pointed, muscular, posteriorly directed flap which, ventrally, protects these structures. The intromittent organ tapers narrowly to a point, lacks a fleshy (glandular) sheath, and is not beveled at the tip as described for *Dinematichthys iluocoeteoides* (Turner, 1946). The claspers angle outward at about 45° from the midline and the inner faces are posterodorsally concave, thus forming a broad groove. Stained material shows the claspers to consist of two ossified supports. The dorsal member is long, narrow and posteriorly both concave and truncate; the ventral is shorter and tapers posteriorly to a point. There is no sign of an "accessory cornified body" similar to that described by Turner (*op. cit.*).

Dissection of the damaged specimen revealed no sign of pyloric caecae.

Fin ray counts and proportional measurements expressed in millimeters and in percentage of standard length or head length are shown for six specimens of the type-series in Table 1. Vertebral counts, from radiographs of this same material, are 11–12 + 27–29 = 39–41. The first neural spine is short and strong; second to fourth longer, the third almost reaching nape margin; fifth to seventh shorter and somewhat depressed; remainder progressively elevated and needlelike; neural spines of abdominal centra with sharp tips. Vertebrae one through five or six with ribs articulating with centra; parapophyses beginning on centra six or seven.

The following color notes were made from the holotype, in life: caudal dusky with a narrow colorless distal margin; anterior of dorsal fin flecked with several fine salmon bars on, or parallel to, the third to fifth dorsal rays; posterior half of dorsal fin and posterior three-quarters of anal fin dusky brown with a pale marginal band; body generally pale gold; eye with black pupil surrounded by a narrow iridescent silvery iris; posterior body translucent with vertebral centra distinctly visible through the distal two-thirds of its length; rose colored gill filaments visible through the opercle; ventral abdomen pale mauve, remainder of ventral surface pale pink; pectoral and ventral fins colorless.

In alcohol the body ground color is pale beige, that of dorsal and anal fins colorless or pale grey; pectoral and ventral fins beige. Eye black. Snout, suborbital and top of head closely speckled with tan to dark brown melanophores; a few near the mandibular symphysis, otherwise, lower jaw, branchiostegal membranes, preopercle and opercle without, or with but a few solitary melanophores. Ventrolateral body from below the

upper third of pectoral axil to near anterior third of anal fin devoid of melanophores; elsewhere body thickly punctate with some decrease in melanophore density ventrally. Posterior half of dorsal fin, caudal fin and most of anal fin densely punctate, resulting in a dark brown coloration; melanophore concentration reduced toward fin margins and bases. This general pattern is well defined in four specimens; in one there has been some fading but microscopic examination shows the described melanophore distribution.

Remarks: The living holotype showed undulatory movements of the vertical fins and body similar to those illustrated by Whitley (1935) for *Dermatopsis macrodon*. In addition, the fish would hang, apparently motionless, an inch or more from the bottom of the aquarium at an attitude of about 45° for considerable periods of time. No loose substrate was provided but general behavior patterns were in some respects (tail standing, etc.) similar to those reported for *Otophidium taylori* (Herald, 1953) and suggest a burrowing habit.

All known specimens of *Gunterichthys* were taken during or immediately after a period of unusual climatic conditions. Five of the paratypes were taken following exposure to abnormally low temperatures; the three Horn Island specimens were found dead in the swash; the damaged Davis Bayou fish was found floating at the surface, and the Ship Island specimen was trawled. These fish were presumably stunned or cold-killed, a common phenomenon in the Gulf of Mexico (Brongersma-Sanders, 1957). The holotype and remaining paratype were found stranded but alive following torrential rains accompanied by rapidly falling storm tides. Rainstorm induced mortality of *Branchiostoma* has been reported in Mississippi Sound (Dawson, 1965) and it is not improbable that *Gunterichthys* is similarly unable to tolerate rapid decrease in salinity. The type-localities have been heavily sampled with fine mesh seines and trawls for several years, particularly during summer months, yet no other specimens have been taken. Observed behavior, occurrence in connection with abnormal environmental conditions, absence from extensive conventional collections and the presence of very reduced eyes lend credence to the assumption that this is a burrowing or burrow inhabiting species. Substrates at and near the collection sites consist of sand, mud and various sand-mud mixtures.

The specific name refers to the exceptional development of the male intromittent organ.

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